The purpose of this spreadsheet is to derive Acceptable Tissue Levels (ATLs; also known as Target Tissue Co (SLVs) for total PCBs for use in Portland Harbor that would be protective of birds that eat fish, and to evalu Assessment (BERA) . Two approaches were used to derive the SLVs and ATLs; the dietary approach and the Another purpose is to identify any mathematical errors and discrepancies in the calculations used to deter occurred, and to determine if a better TRV can be established for PCBs.

The spreadsheet compares various risk parameters used by LWG in the 2011 BERA to values 1) recommend EPA (1995) Great Lakes Initiative document.

The SLVs are presented in the "SLVs_Compared" tab, and TRVs and ATLs are compared in the "Eco TRVs + A rates and body weights from multiple sources, and re-calculates TRVs based on these values. SLVs were ca column (i.e., to evaluate sensitivity of the BSAF value) will automatically update the SLV values presented i

Some discrepancies were observed in calculations between LWG and EcoSSLs, which can be seen in the "IR used to calculate TRVs account for some discrepancies (e.g., slight body weight difference results in large T dry and wet weight doses and ingestion rates. The values calculated here were conducted by matching dry cases it was unknown or unreported in the literature if a dose was dry or weight, but in these cases the stu have made little difference in the outcome.

The final yellow highlighted row under each species in the "SLVs_Compared" tab and the "Eco TRVs + ATLs would provide the best scientifically-supported level of protection for upper trophic level species to totaql for some species exceeds ATL values that are considered protective of fish, and no uncertainty or safety fac toxicity values are unavailable, or for sensitive species or guilds).

ɔncentrations (TTCs) or Target Tissue Levels (TTLs), and Sediment Screening Levels
ate or double check specific parameters used in the Baseline Ecological Risk
e egg approach, which are discussed in the notes section of the "SLVs_Compared" tab.
mine Toxicity Reference Values (TRVs), identify why these discrepancies may have

ɬed previously by EPA, 2) are in Oregon DEQ's bioaccumulation guidance, and 3) the

ATLs+SLVs". The "IRs&BodyWtComparisons" sheet presents and compares ingestion
alculated using a generic BSAF for PCBs of 4. Changing the BSAF in the appropriate
in the "SLVs_compared tab".

s&BodyWtComparisons" tab. Some differences in ingestion rates and body weights
RV differences), and other differences were associated with interpreting or converting
/ weight doses to dry weight IRs, and wet weight doses to wet weight IRs. In some
udy used lab prepared food which had 10% or less moisture, so any conversions would

s + SLVs" tab shows the recommended value by US Fish and Wildlife Service (FWS) that
PCBs. It should be noted that even the recommended value for the dietary approach
ctors were used in the equations (often used in to better protect species were direct

SLV= Value in sediment (µg/kg dry weight) considered protective of avian receptors at the individual an

	EGG APPROACH		EGG APPROACH		DIETARY APPROACH		DIETARY APPROACH	
	Bald Eagle		Osprey		Bald Eagle		Osprey	
	Individual	Population	Individual	Population	Individual	Population	Individual	Population
Total PCBs								
Gov Tea	10	51	10	51	13	65	38	77

ND = not determined

Final recommended value by FWS

Notes:

EGG APPROACH:

The egg approach was selected as a risk evaluation tool because the total PCBS cause embryotoxicity dietary approach only indirectly addresses this risk, and data are available on total PCB concentratio embyro growth will occur at low PCB concentrations (i.e., at concentrations that may otherwise not i primarily endpoint when evaluating risk for total PCBs, and selecting a PRG value protective of reduc Reduced hatchability was also used as the endpoint to develop the dietary approach, but it is a less c

The bald eagle was the receptor selected to represent protective values based on the egg approach. some correlations in field data (and good correlations in lab test with other bird species) between in in this approach, as bald eagles do eat other prey in addition to fish (including ducks, fish-eating bird bald eagles studied in the lower Columbia River fed primarily on fish (90%) during the breeding seas For our risk model, we consider total PCBs to be accumulated in the adult female's body over time a fed on heavily during the breeding season, fish likely contribute a large portion of the PCB body burd the eggs themselves.

Using the SLV based on bald eagles should be protective of most other fish-eating birds. However, th range may be considered important in a risk evaluation. The eagle's primarily foraging range during some level of site use factor may be considered when evaluating risk using the SLVs.

DIETARY APPROACH:

Dietary exposure to PCBs can cause reduced hatchability , reduced growth in embryos, embryo mor based on reduced hatchability. The recommended sediment screening value for total PCBs (15 and considered protective of reduced hatchability in kingfishers. The kingfisher was selected as the best more of an obligate fish-eater compared to other species, and is non-migratory in this area (see Kelly protective of mortality for most other fish-eating bird species, and it is likely that a site use factor wo

d population levels (based on BSAF of 4)

DIETARY APPROACH		DIETARY APPROACH		DIETARY APPROACH	
Spotted Sandpiper		Hooded merganser		Kingfisher	
Individual	Population	Individual	Population	Individual	Population
10	19	22	44	15	30

y in birds and can reduce hatchability, cause deformities, and impact growth. The
ns in bird eggs that reduce hatchability. Reduced hatchabiltiy and reduced
impact the adult bird). For this reason, reduced hatchability was selected as the
ced hatchability will mostly likely be protective of all other effects from PCBs.
direct measruement.

The eagle was selected to represent resident, fish-eating birds, and there are
creased total PCBsin eggs and lowered productivity). There is some uncertainty
s, some mammals, and also scavenge when opportunity is available). However,
on, whereas they relied a bit more on waterfowl during the non-breeding season.
nd especially during the month before nesting and egg laying. Because fish are
lens in the adult female just prior to egg laying, as well as to the PCB burden in

he foraging range of an eagle is large compared to other birds and the larger
the breeding season is considered to be within 1 mile of a nest site. Therefore,

tality, and other effects. For the dietary approach, risk from total PCBs was
30 ppb) was based on kingfisher exposure. Thus, the sediment values are
: representative species for Portland Harbor because it has a small home range, is
y et al. 2009). Therefore, protection at the kingfisher level would most likely be
ould not be needed to fully represent risk.

Equations used to calculate Acceptable Tissue Levels (ATLs) in prey items and NOAEL and LOAEL TRVs

Calculating ATL's from TRV's (IRs in kg		Calculating ATL's when IRs are in units of kg/kg BW-day	
ATL =	TRV (mg/kg BW-day)	ATL =	TRV (mg/kg BW-day)
mg/kg (wet weight)	(IR kg-ww-day/ BW)	mg/kg (wet weight)	(IR kg/kg-ww-day)

Calculation of TRVs			
NOAEL TRV = (mg/kg-d)	NOAEL (mg/kg ww)*IR (kg-ww-d) / BW (kg)	or	NOAEL (mg/kg ww)*IR (kg/kg-d)
LOAEL TRV = (mg/kg-d)	LOAEL (mg/kg ww)*IR (kg-ww-d) / BW (kg)	or	LOAEL(mg/kg ww)*IR (kg/kg-d)

Calculation of Sediment Bioaccumulation SLVs

SLVs for Organics

SLV = mg/kg (wet weight)	F_{oc} ·	ATL / (BSAF * F_L)	Equation 3-5 (DEQ 2002)
Fl =	0.09	unitless (whole body)	These parameters are updatable based on site-specific analyses.
Foc =	0.01		

- F_L = Fraction Lipid in Fish or other organism Tissue-default = 0.09 whole body unitless
- Foc = Fraction Organic Carbon in sediment-default = 0.01 unitless
- BSAF = Biota-Sediment Accumulation Factor (kg/kg)
- ATL = Acceptable Tissue Level from ATL worksheets (mg/kg-wet)
- SLV = Sediment Screening-Level Value

$$BSAF = \frac{C_{fish}\ (\mu g/Kg\ wet\ wt) \,/\, F_L\ (g\ L\ per\ g/wet\ wt)}{C_{sed}\ (\mu g/Kg\ dry\ wt) \,/\, F_{oc}\ (g\ org\ carb/g\ dry\ wt)}$$

Cfish = contaminant concentration in fish, wet weight
Csed = contaminant concentration in sediment, dry weight
Foc = organic carbon fraction in sediment, dry weight, default = 0.01
FL = lipid fraction in fish, wet weight, default = 0.09 whole body

EGG APPROACH: Calculating ATL's from TRV's

ATL = TRV / BMF
mg/kg (wet wt)

- ATL = acceptable tissue level (mg/kg wet wt)
- TRV = toxicity reference value (mg/kg) from literature
- BMF = biomagnification factor (unitless) from literature

Parameters based on LWG BERA, 2011

DIETARY APPROACH

Endpoint species parameters / Surrogate Test Species Parameters

	Bald Eagle	Bald Eagle LWG	Osprey	Osprey LWG	Spotted Sandpiper RSET	Spotted Sandpiper LWG	Hooded Merganser LWG	Belted Kingfisher RSET	Belted Kingfisher LWG	Pelican EPA 1995	Kestrel EPA 1995	Kestrel LWG	Barn Owl EPA 1995	Barn Owl LWG	Black Duck (E[illegible]	Black Duck LWG	Mallard (EcoSSL	Mallard LWG	Mallard LWG EcoSSL & Carlisle et al	
IR Kg/day wet wt	0.54	0.54	0.395	0.4	0.039	0.055	0.2	0.5	0.08	0.62	--		0.100			0.125	--	0.1082		IR Kg/day wet wt
IR Kg/day dry wt	NA									0.155		0.0136		0.0530					0.062	IR Kg/day dry wt
IR kg/kg-day wet wt										--	0.37		--		0.06		0.06			IR kg/kg-day wet wt
IR kg/kg-day dry weight										--	--		--				0.054			IR kg/kg-day dry weight
BW (kg)	4.5	4.5	1.99	1.9	0.0471	0.047	0.54	0.147	0.147	3.5	0.12	0.12	0.466	0.524	1.1	1.25	1	1.082	1.1	BW (kg)
LOAEL mg/kg wet wt	48									0.15	3	11.3	2.83	3.1	10	10	10	9	5	LOAEL mg/kg wet wt unless otherwise noted in field comments
NOAEL mg/kg wet wt	3									NA	0.3	1.13	--				2		1	NOAEL mg/kg wet wt

Acceptable fish tissue value comparison:

0.04 mg total PCBs/kg wet wt = based on 1.5% Lipid in tissue = Residue Effect Threshold, above which adverse sublethal effects to wild salmonids would be expected (Meador et al. 2002).
0.06 mg total PCBs/kg wet = ATL in fish tissue protective of bald eagles in the lower Columbia River (US Fish and wildlife Service 2004) .
0.4 mg total PCBs/kg wet wt = ATL in fish tissue (and LOAEL ATL of 1.8 mg/kg wet wt) considered protective of ospreys in the Willamette River based on a BMF or 11 (Henny et al. 2003) and a NOAEL of 4 and LOAEL of 20 mg/kg in osprey eggs ww from Elliott et al. (2001/2) for low effects.
1.1 total PCBs (as Aroclors) / kg wet wt = ATL is fish tissue (NOAEL) and 3.4 total PCBs / kg wet wt (LOAEL) estimated by DEQ Bioaccumulation guidance.
0.43 mg total PCBs/kg wet wt = CTL in fish estimated by DEQ Bioaccum Giuidance based on tthe National Recommended WQC of 0.014 ug/L and BCF of 31,000 l/kg.
0.14 mg Total PCBs/kg wet wt as level in fish that would have no effect on eagle eggs in the Great Lakes ; BMF of 28 and eagle egg NOAEC of 4.0 mg/kg ww (Giesy et al. 1995).

TABLE 1

ATL calculation using endpoint species BW&IR; Sediment SLV Calculations - PPB DRY WT

Endpoint Species: Bald Eagle	Chemical	Estimate of Eagle Individual NOAEL TRV (mg/kg-d)	Surrogate Test Species used for NOAEL TRV	Surrogate Test Endpoints associated with effect levels	Surrogate TRV reference	Estimate of Eagle Population LOAEL TRV(mg/kg-d)	Surrogate Test Species used for LOAEL TRV	Surrogate Test Endpoints associated with effect levels	reference	Eagle Individual ATL (Wet Wt.) (ppm)	Eagle Population ATL (Wet Wt.) (ppm)	BSAF (used for organics) kg/kg	Eagle Individual SLV - µg/kg Dry Wt (ppb)	Eagle Population SLV - µg/kg Dry Wt. (ppb)
Total PCB estimates:														
Used by DEQ in Bioaccumulation Guida[nce]	Total PCBs	0.20	Pheasant	Reduced hatchability at LOE[L]	Dahlgren et al. 1972 as c[ited]	0.60	Pheasant	Reduced hatchability a[t]	Dahlgren et al. 1972 (as c[ited])	1.67	5.00	4	46	139
Used by EPA 1995 Great Lakes Initiativ[e]	Total PCBs (1254)	0.18	Pheasant	Reduced hatchability	Dahlgren et al. 1972	1.80	Pheasant	Reduced hatchability	Dahlgren et al. 1972	1.50	15.00	4	42	417
LWG used in BERA	Total PCBs (1242)	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	2.42	4.8	4	67	134
LWG estimated value (chickens)	Total PCBs (1248)	0.06	Chicken	Reduced egg production an[d]	Scott et al. 1975	0.6	Chicken	Reduced egg productio[n]	Scott et al. 1975	0.51	5.08	4	14	141
LWG estimated value (chickens)	Total PCBs (1254)	0.29	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	2.62	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	2.42	21.83	4	67	606
LWG estimated value (mallards)	Total PCBs (1254)	2.50	Mallard	Reproductive success	Custer and Heinz 1980					20.8	NR	4	579	NR
LWG estimated value (mallards)	Total PCBs (1242)					15.00	Mallard	Reduced hatchability a[nd]	Haseltine and Prouty 1980	NR	125.00	4	NR	3472
Selected or Recommended values:												4		
EPA/Gov't team recommeded to LWG	Total PCBs	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	2.42	4.8	4	67	134

The TRV selected is based on a study from Dahlgren et al. 1972 (and evaluated by the Great Lakes WQ Initiative (EPA 1995). A LOAEL of 1.8 mg/kg-day is reported in the study, and an interspecies UF of 3 is used to go to piscivorous birds, and a LOAEL-to-NOAEL UF of 3 is used to estimate the NOAEL.

TABLE 2

ATL calculation using endpoint species BW&IR; Sediment SLV Calculations - PPB DRY WT

Endpoint Species: Osprey	Chemical	Estimate of Osprey Individual NOAEL TRV (mg/kg-d)	Surrogate Test Species used for NOAEL TRV	Surrogate Test Endpoints associated with effect levels	Surrogate TRV reference	Estimate of Osprey Population LOAEL TRV (mg/kg-d)	Surrogate Test Species used for LOAEL TRV	Surrogate Test Endpoints associated with effect levels	reference	Osprey Individual ATL (Wet Wt.) (ppm)	Osprey Population ATL (Wet Wt.) (ppm)	BSAF (used for organics) kg/kg	Osprey Individual SLV - µg/kg Dry Wt (ppb)	Osprey Population SLV - µg/kg Dry Wt. (ppb)
Total PCB estimates:														
Used by DEQ in Bioaccumulation Guida[nce]	Total PCBs	0.20	Pheasant	Reduced hatchability at LOE[L]	Dahlgren et al. 1972 as c[ited]	0.60	Pheasant	Reduced hatchability a[t]	Dahlgren et al. 1972 (as c[ited])	0.95	2.86	4	26	79
Used by EPA 1995 Great Lakes Initiativ[e]	Total PCBs (1254)	0.18	Pheasant	Reduced hatchability	Dahlgren et al. 1972	1.80	Pheasant	Reduced hatchability	Dahlgren et al. 1972	0.86	8.57	4	24	238
LWG used in BERA	Total PCBs (1242)	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	1.38	2.76	4	38	77
LWG estimated value (chickens)	Total PCBs (1248)	0.06	Chicken	Reduced egg production an[d]	Scott et al. 1975	0.6	Chicken	Reduced egg productio[n]	Scott et al. 1975	0.29	2.90	4	8	81
LWG estimated value (chickens)	Total PCBs (1254)	0.29	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	2.62	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	1.38	12.47	4	38	346
LWG estimated value (mallards)	Total PCBs (1254)	2.50	Mallard	Reproductive success	Custer and Heinz 1980					11.90		4	331	NR
LWG estimated value (mallards)	Total PCBs (1242)					15.00	Mallard	Reduced hatchability a[nd]	Haseltine and Prouty 1980		71.39	4	NR	1983
Selected or Recommended values:												4		
EPA/Gov't team recommeded to LWG	Total PCBs	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	1.38	2.76	4	38	77

The TRV selected is based on a study from Dahlgren et al. 1972 (and evaluated by the Great Lakes WQ Initiative (EPA 1995). A LOAEL of 1.8 mg/kg-day is reported in the study, and an interspecies UF of 3 is used to go to piscivorous birds, and a LOAEL-to-NOAEL UF of 3 is used to estimate the NOAEL.

TABLE 3

ATL calculation using endpoint species BW&IR; Sediment SLV Calculations - PPB DRY WT

Endpoint Species: Spotted Sandpiper	Chemical	Estimate of Spotted Sandpiper Individual NOAEL TRV (mg/kg-d)	Surrogate used for NOAEL TRV	Surrogate Endpoints associated with effect levels	Surrogate TRV reference	Estimate of Spotted Sandpiper Population LOAEL TRV (mg/kg-d)	Surrogate used for LOAEL TRV	Surrogate Endpoints associated with effect levels	reference	Spotted Sandpiper Individual ATL (Wet Wt.) (ppm)	Spotted Sandpiper Population ATL (Wet Wt.) (ppm)	BSAF (used for organics) kg/kg	Spotted Sandpiper Individual SLV - ug/kg Dry Wt (ppb)	Spotted Sandpiper Population SLV - ug/kg Dry Wt. (ppb)
Total PCB estimates:														
Used by DEQ in Bioaccumulation Guida[nce]	Total PCBs	0.20	Pheasant	Reduced hatchability at LOE[L]	Dahlgren et al. 1972 as c[ited]	0.60	Pheasant	Reduced hatchability a[t]	Dahlgren et al. 1972 (as c[ited])	0.24	0.72	4	7	20
Used by EPA 1995 Great Lakes Initiativ[e]	Total PCBs (1254)	0.18	Pheasant	Reduced hatchability	Dahlgren et al. 1972	1.80	Pheasant	Reduced hatchability	Dahlgren et al. 1972	0.22	2.17	4	6	60
LWG used in BERA	Total PCBs (1242)	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	0.35	0.70	4	10	19
LWG estimated value (chickens)	Total PCBs (1248)	0.06	Chicken	Reduced egg production an[d]	Scott et al. 1975	0.6	Chicken	Reduced egg productio[n]	Scott et al. 1975	0.07	0.74	4	2	20
LWG estimated value (chickens)	Total PCBs (1254)	0.29	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	2.62	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	0.35	3.16	4	10	88
LWG estimated value (mallards)	Total PCBs (1254)	2.50	Mallard	Reproductive success	Custer and Heinz 1980					3.02		4	84	NR
LWG estimated value (mallards)	Total PCBs (1242)					15.00	Mallard	Reduced hatchability a[nd]	Haseltine and Prouty 1980		18.12	4	NR	503
Selected or Recommended values:												4		
EPA/Gov't team recommeded to LWG	Total PCBs	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	0.35	0.70	4	10	19

The TRV selected is based on a study from Dahlgren et al. 1972 (and evaluated by the Great Lakes WQ Initiative (EPA 1995). A LOAEL of 1.8 mg/kg-day is reported in the study, and an interspecies UF of 3 is used to go to piscivorous birds, and a LOAEL-to-NOAEL UF of 3 is used to estimate the NOAEL.

TABLE 4

ATL calculation using endpoint species BW&IR; Sediment SLV Calculations - PPB DRY WT

Endpoint Species: Hooded Merganser	Chemical	Estimate of Hooded merganser individual NOAEL TRV (mg/kg-d)	Surrogate used for NOAEL TRV	Surrogate Endpoints associated with effect levels	Surrogate TRV reference	Estimate of Hooded merganser Population LOAEL TRV (mg/kg-d)	Surrogate used for LOAEL TRV	Surrogate Endpoints associated with effect levels	reference	Hooded merganser Individual ATL (Wet Wt.) (ppm)	Hooded merganser Population ATL (Wet Wt.) (ppm)	BSAF (used for organics) kg/kg	Hooded merganser Individual SLV - ug/kg Dry Wt (ppb)	Hooded merganser Population SLV - ug/kg Dry Wt. (ppb)
Total PCB estimates:														
Used by DEQ in Bioaccumulation Guida[nce]	Total PCBs	0.20	Pheasant	Reduced hatchability at LOE[L]	Dahlgren et al. 1972 as c[ited]	0.60	Pheasant	Reduced hatchability a[t]	Dahlgren et al. 1972 (as c[ited])	0.54	1.62	4	15	45
Used by EPA 1995 Great Lakes Initiativ[e]	Total PCBs (1254)	0.18	Pheasant	Reduced hatchability	Dahlgren et al. 1972	1.80	Pheasant	Reduced hatchability	Dahlgren et al. 1972	0.49	4.86	4	14	135
LWG used in BERA	Total PCBs (1242)	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	0.78	1.57	4	22	44
LWG estimated value (chickens)	Total PCBs (1248)	0.06	Chicken	Reduced egg production an[d]	Scott et al. 1975	0.6	Chicken	Reduced egg productio[n]	Scott et al. 1975	0.16	1.65	4	5	45
LWG estimated value (chickens)	Total PCBs (1254)	0.29	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	2.62	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	0.78	7.07	4	22	197
LWG estimated value (mallards)	Total PCBs (1254)	2.50	Mallard	Reproductive success	Custer and Heinz 1980					6.75		4	188	NR
LWG estimated value (mallards)	Total PCBs (1242)					15.00	Mallard	Reduced hatchability a[nd]	Haseltine and Prouty 1980		40.50	4	NR	1125
Selected or Recommended values:												4		
EPA/Gov't team recommeded to LWG	Total PCBs	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	0.78	1.57	4	22	44

The TRV selected is based on a study from Dahlgren et al. 1972 (and evaluated by the Great Lakes WQ Initiative (EPA 1995). A LOAEL of 1.8 mg/kg-day is reported in the study, and an interspecies UF of 3 is used to go to piscivorous birds, and a LOAEL-to-NOAEL UF of 3 is used to estimate the NOAEL.

TABLE 5

Sediment SLV Calculations - PPB DRY WT

Endpoint Species: Belted Kingfisher	Chemical	Estimate of belted kingfisher individual NOAEL TRV (mg/kg-d)	Surrogate used for NOAEL TRV	Surrogate Endpoints associated with effect levels	Surrogate TRV reference	Estimate of belted kingfisher Population LOAEL TRV (mg/kg-d)	Surrogate used for LOAEL TRV	Surrogate Endpoints associated with effect levels	reference	belted kingfisher Individual ATL (Wet Wt.) (ppm)	belted kingfisher Population ATL (Wet Wt.) (ppm)	BSAF (used for organics) kg/kg	belted kingfisher Individual SLV - ug/kg Dry Wt (ppb)	belted kingfisher Population SLV - ug/kg Dry Wt. (ppb)
Total PCB estimates:														
Used by DEQ in Bioaccumulation Guida[nce]	Total PCBs	0.20	Pheasant	Reduced hatchability at LOE[L]	Dahlgren et al. 1972 as c[ited]	0.60	Pheasant	Reduced hatchability a[t]	Dahlgren et al. 1972 (as c[ited])	0.37	1.10	4	10	31
Used by EPA 1995 Great Lakes Initiativ[e]	Total PCBs (1254)	0.18	Pheasant	Reduced hatchability	Dahlgren et al. 1972	1.80	Pheasant	Reduced hatchability	Dahlgren et al. 1972	0.33	3.31	4	9	92
LWG used in BERA	Total PCBs (1242)	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	0.53	1.07	4	15	30
LWG estimated value (chickens)	Total PCBs (1248)	0.06	Chicken	Reduced egg production an[d]	Scott et al. 1975	0.6	Chicken	Reduced egg productio[n]	Scott et al. 1975	0.11	1.12	4	3	31
LWG estimated value (chickens)	Total PCBs (1254)	0.29	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	2.62	Chicken	Reduced hatchability	Platonow and Reinhart 1[illegible]	0.53	4.81	4	15	134
LWG estimated value (mallards)	Total PCBs (1254)	2.50	Mallard	Reproductive success	Custer and Heinz 1980					4.59		4	128	NR
LWG estimated value (mallards)	Total PCBs (1242)					15.00	Mallard	Reduced hatchability a[nd]	Haseltine and Prouty 1980		27.56	4	NR	766
Selected or Recommended values:												4		
EPA/Gov't team recommeded to LWG	Total PCBs	0.29	Chicken	Reduced hatchability	Britton and Huston 1973	0.58	Chicken	Reduced hatchability	Britton and Huston 1973	0.53	1.07	4	15	30

The TRV selected is based on a study from Dahlgren et al. 1972 (and evaluated by the Great Lakes WQ Initiative (EPA 1995). A LOAEL of 1.8 mg/kg-day is reported in the study, and an interspecies UF of 3 is used to go to piscivorous birds, and a LOAEL-to-NOAEL UF of 3 is used to estimate the NOAEL.

EGG APPROACH

Bird Egg TRVs, ATLs, and SLVs

BALD EAGLE

ATL OR PROTECTION LEVEL FOR PREY ITEMS

Chemical	Eagle Egg Individual TRV (mg/kg)	Eagle Egg Population TRV (mg/kg)	Willamette River Osprey BMF study: Whole Body Fish to Osprey Egg	In PPM wet wt Eagle Individual ATL (TRV/BMF) in mg/kg	In PPM wet wt Eagle Population ATL (TRV/BMF) in mg/kg	In PPB wet wt Eagle Individual ATL (ug/kg)	In PPB wet wt Eagle Population ATL (ug/kg)	BSAF	EGG: Eagle Egg Individual SLV (ppm) dry wt	EGG: Eagle Egg Population SLV (ppm) dry wt
Total PCBs	4	20	11	0.36	1.82	364	1818	4	10	51

OSPREY

ATL OR PROTECTION LEVEL FOR PREY ITEMS

Chemical	Osprey Egg Individual TRV (mg/kg)	Osprey Egg Population TRV (mg/kg)	Willamette River Osprey BMF study: Whole Body Fish to Osprey Egg	In PPM wet wt Osprey Individual ATL (TRV/BMF) in mg/kg	In PPM wet wt Osprey Population ATL (TRV/BMF) in mg/kg	In PPB wet wt Osprey Individual ATL (ug/kg)	In PPB wet wt Osprey Population ATL (ug/kg)	BSAF	EGG: Osprey Egg Individual SLV (ppm) dry wt	EGG: Osprey Egg Population SLV (ppm) dry wt
Total PCBs	5	20	11	0.45	1.82	455	1818	4	13	51

Selected studies of from LWG in BERA

Surrogate Test Species	Chemical	Study Dose for NOAEL mg/kg (WET wt)	Study Dose for LOAEL mg/kg (WET wt)	LWG Study Dose for NOAEL mg/kg DRY WT	LWG Study Dose for LOAEL mg/kg DRY WT	Fraction moisture in food	Ingestion Rate (IR) kg/day
Kestrel	1254				3.3	0.1	0.0136
Chicken	1254	40					0.0034
Chicken	1242	5	10				0.0997
Chicken	1248	1	10				0.105
Chicken	1254	5	45		50	0.1	0.0997
Chicken	1232		20				0.0997
Mallard	1254	25					0.1082
Mallard	1254	39					0.1082
Mallard	1242		150				0.1082

Selected for use as avian TRV in BERA

LWG did not adjust the LOAEL value to wet wt before doing calculation (the IR is in wet wt). Using a %moist

Receptor-chemical evaluation not conducted by LWG (instead they used EcoSSL for DDT of 0.227 mg/kg-d)

Data used by the Great Lakes Initiative as reported by EPA 1995

Surrogate Test Species	Chemical	Study Dose for NOAEL mg/kg	Study Dose for LOAEL mg/kg	Fraction moisture in food	Ingestion Rate (IR) kg/day WET WT unless otherwise noted
Pheasant	1254	2	20	NR	Inferred
Chicken	1248	1	10	0.1	0.067
Chicken	124,212,481,254	2	20	0.1	0.067
Chicken	1254		5	0.1	0.067
Chicken	1242	5	10	0.1	0.067

Selected for use as the avian TRV

Data used by DEQ Bioaccumulation Guidance

Surrogate Test Species	Chemical	Study Dose for NOAEL mg/kg	Study Dose for LOAEL mg/kg	Fraction moisture in food	Ingestion Rate (IR) kg/day WET WT unless otherwise noted
	1254			NR	Inferred

Selected based on EPA 1995 according to guidance but unknown which species was used.

Body Weight (BW) kg	NOAEL mg/kg-day	LOAEL mg/kg-day	Check: Test calculation for NOAEL (mg/kg-day)	Check: Test calculation for LOAEL (mg/kg-day)
0.13		0.35		0.35
2.56	0.054		0.05	
1.71	0.29	0.58	0.29	0.58
1.71	0.061	0.61	0.06	0.61
1.71	0.29	2.90	0.29	2.62
1.71		1.20		1.17
1.082	2.5		2.5	
1.082	3.9		3.9	
1.082		15		15

ture of 1, the LOAEL actually should be 2.62 (unless LWG mislabelled the 50 value as dw).

Body Weight (BW) kg	NOAEL mg/kg-day	LOAEL mg/kg-day	Check: Test calculation for NOAEL (mg/kg-day)	Check: Test calculation for LOAEL (mg/kg-day)
1	0.18	1.8	#VALUE!	#VALUE!
2	0.067	0.67	0.07	0.67
2	0.13	1.30	0.13	1.34
2		0.58		0.34
2	0.34		0.34	0.67

Body Weight (BW) kg	NOAEL mg/kg-day	LOAEL mg/kg-day	Check: Test calculation for NOAEL (mg/kg-day)	Check: Test calculation for LOAEL (mg/kg-day)
1	0.2	0.6	#VALUE!	#VALUE!

	Ref
reduced eggshell weight	Lowe and Stendell 1991
no effect fertility and hat	Ahmed at la. 1978
Reduced hatchability	Britton and Huston 1973
Reduced egg productior	Scott et al. 1975
Reduced hatchability	Platonow and Reinhart 1973
Reduced hatchability, er	Cecil et al 1974
Reproductive success	Custer and Heinz 1980
No effefct on egg produ	Risebrough and Anderson 1975
Reduced hatchability, er	Haseltine and Prouty 1980

DW = ww*1 / 1- %moisture

	Ref
Hatchability	Dahlgren et al. 1972
Egg production and hatc	Scott 1977
Egg production and hatc	Lillie et al. (1974)
Egg production and ferti	Platonow and Reinhart (1973)
No effects at 5 ppm, sig	Britton and Huston (1973)

Ref

REFEENCES

Birds NOAL and LOAL dietary TRV in mg/kg day
LWG
Total PCBs
0.29 NOAEL
0.58 LOAEL
Britton and
TRVs are based on reduced egg hatchability in chickens, which have high sensitivity to PCBs toxicity compared wit

Mammal NOAL and LOAL dietary TRV in mg/kg day
Total PCBs
0.0074c NOAEL
0.037 LOAEL
Restum et al. (1998)
TRVs are based on several mink reproduction endpoints. study in which mMink were fed field-collected fish that co

		TTC (Prey Tissue)		
Spotted Sandpiper		Hooded Merganser	Bald Eagle	Osprey
NOAEL	248	783	2420	1,380
LOAEL	496	1570	4,830	2,760

µg/kg ww

:h other species tested. A lower LOAEL for eggshell thinning in American kestrel was reported; however, the 5% ma

ntained detectable concentrations of other chemicals that were analyzed and detected (e.g., dioxins/furans, DDTs,

Mink	River otter
44.9	75
224	375

agnitude of effect is unlikely to be ecologically significant. The LOAEL for mallards (15 mg/kg dw/day) is approximat

and other organochlorine pesticides).; NOAEL was extrapolated from the LOAEL using a factor of 5.

ely 30 times as great as the selected LOAEL (Attachment 14), indicating the selected TRV may overestimate effects

s on ducks, such as hooded merganser.